



2009 U.S. Army Corrosion Summit

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Not Just a Cover

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- **Continued deployments are placing stress on unit and equipment readiness**
- **Higher priced, more sophisticated equipment requires careful lifecycle management**
- **Traditional methods of protection proved ineffective (Tarps/Shrink Wraps)**
- **MILCON costs are rising and fixed facilities at home provide no protection when equipment is deployed**
- **For the past 5 years Envelop Protective Covers has provided the US Military cost avoidance by reducing corrosion and the resulting degradation**



Individual Existing Corrosion Fighting Solutions Were Inadequate

Dehumidification Systems

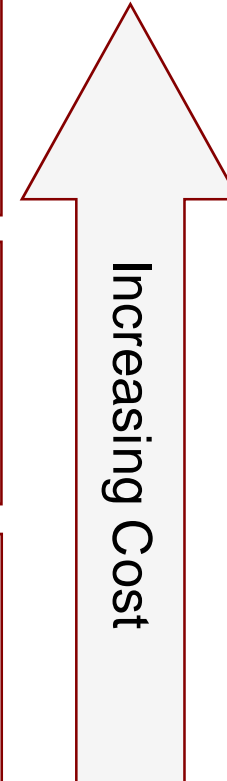
very expensive
cumbersome
very effective when $RH < 50\%$

Vapor Corrosion Inhibitors

moderate expense
hermetic environments required
effective if used properly

Tarps

potentially inexpensive
not effective
establishes greenhouse effect



The Facts

- **A 2003 GAO study (GAO-03-753) states that corrosion costs the US Military at least \$20 Billion per year**
- **Corrosion mitigation is the largest controllable maintenance cost in the US Military (GAO-03-753)**
- **Cost of Corrosion for Army Ground Vehicles is \$2.02 Billion per year (Report SKT50T1).**



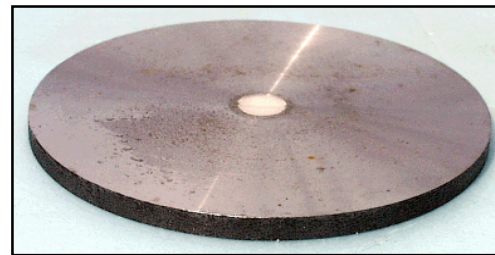
Envelop Covers overcome equipment degradation caused by corrosion

The Search

- **The Navy recognized that surface treatments, such as coatings, corrosion inhibitors, oils, surface bonded corrosive resistant materials were not enough..... In addition when standard tarps were used to layer protection in many cases they accelerated corrosion (Greenhouse Effect)**
- ***Initiated a search for a better form of protection that would***
 - Act to remove moisture/water from the contained environment
 - Store and subsequently allow for the evaporation of that moisture vapor to the exterior of the contained environment
 - Provide VCI's into the contained environment to reduce bonding of moisture with metal, electronic and optical equipment
 - Have a long lasting water proof outer cover
 - Not absorb petroleum products



Mild Steel after
Five Weeks
Exposure under
Respective
Coverings



Standard Tarps Enhance Corrosion

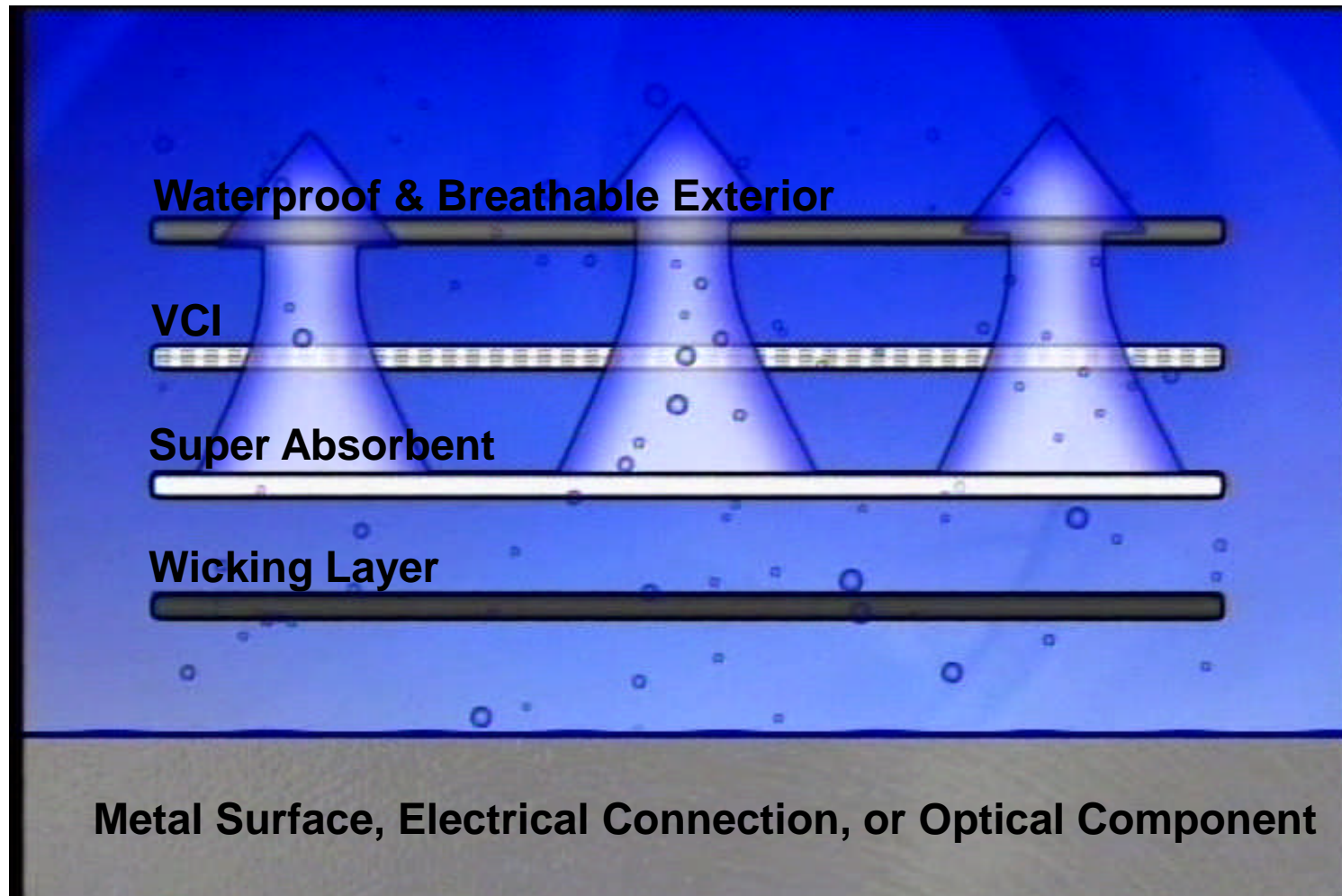
Envelop Protection System

The Development

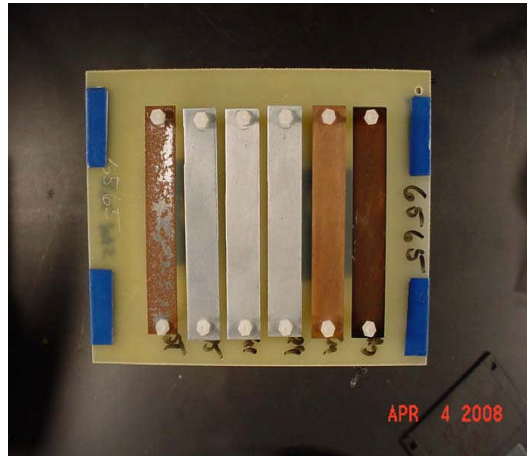
- **Envelop Protective Covers were designed in conjunction with the US Military to protect weapons, electrical components, optics, and critical equipment from the harshest environments**
 - US Navy Small Business Research Grant (SBIR).
- **Reduces degradation caused by Moisture, Heat, UV, Dust and Debris**
 - Up to 90% reduction in corrosion
 - Maintains equipment within 10 degrees or less of ambient temperature
 - Reduces dust and sand build up by up to 95%



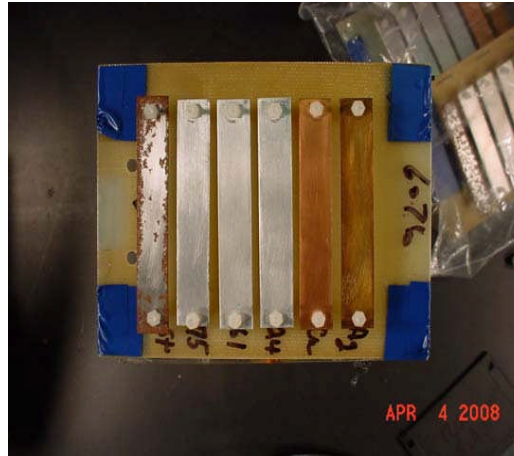
The Technology



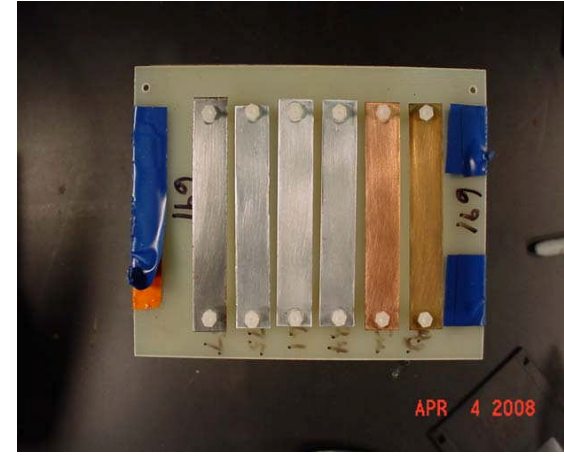
Results – USAF Sheltering Study



Uncovered, Inside Shelter



Vinyl Cover, Outside Shelter



Envelop Cover, Outside Shelter

- One year long independent study
- Compared shelters, vinyl covers and Envelop Covers
- Envelop nearly 20 times as effective as shelters
- Envelop more than 10 times as effective as vinyl covers

The Results

- **Tested and Validated by US Navy, USMC, US Air Force, and US Army**
 - Only approved soft cover for topside weapons and equipment – US Navy
 - Chosen to protect all M777 Howitzers (USMC) and HIMARS Launchers (US Army)
 - Selected by the Apache PM to protect the MTADS
- **Proven to keep weapons and equipment functioning in all environments**
 - Over 20,000 covers deployed world wide on US Military weapons and equipment - including use in Iraq and Afghanistan



ROI ranges from 3:1 to over 20:1

The Results – M198 Howitzer

- Camp Lejeune, NC
- 30 day side by side validation



With Envelop Cover

Standard Maintenance



The Results – M2 .50 Cal. Machine Gun

- USS Russell – Pacific Ocean
- Two week validation while underway
- No maintenance performed on either weapon



**Protected by Envelop
Protective Covering**



**Protected by Standard
Navy Tarpaulins**



“These covers were very effective and greatly contributed to the howitzers being used for training in a minimum amount of time. “Busting” rust on the M198 generally takes 1 hour. **After removing the covers it took less than 10 minutes.** Over a longer period of time the covers would **allow us to spend more time training and less time pulling maintenance.** “

- SFC USA, Senior Instructor, E 1-78FA

USMC M198 Man Hour Analysis

Envelop Covers save from 2400-2900 Man Hours per year.



The Feedback M777 LW 155mm Howitzer





“These covers were installed on the howitzer from **12 Dec 07 through 29 Jan 08 without any maintenance being performed** or the covers being removed. During this time the temperature ranged from 9 to 73 degrees with varying humidity, rain, 35mph winds, and dirt storms. Upon taking the covers off on 30 Jan 08 the M777A2 had **zero rust and required no maintenance.** “

- SFC USA, Senior Instructor, E 1-78FA

“Right now, several guns are not being utilized and are covered in the open behind our motor pool. The amount of rust / corrosion is minimal and the protection from the elements is outstanding.. “

- CPT USA, S-4 , 2-11th FA, Deployed in Iraq

The Return

Asset Description	Initial cost of weapon	Annual Savings with Envelop	Daily Cost Avoidance with Envelop	Cost per day of Envelop Cover	Envelop ROI \$spent/\$saved	Comments
 Phalanx CIWS OGB	+ \$3 million	\$28,584	\$78	\$6	13	Operational cover provides 24/7 protection to vulnerable components of CIWS substantially reducing daily maintenance and repairs.
 Mk96 .50cal	\$8,000	\$13,871	\$38	\$1	27.14	Weapon demands 1 hour of corrosion related maint per day. Envelop reduces to 1 hour per week.

The Covers



M777 LW 155mm Howitzer



M109 Paladin

The Covers



HIMARS Crane USMC



Bradley Fighting Vehicle

M1 Abrams – In development

The Covers



HEMTT Wrecker

- Developed in conjunction with NJNG
- Protects critical maintenance and MT assets



5 Ton Winch



Rifle Racks



LVS Boom

The Covers



AH-64D MTADS



UH-60 Windscreen



Shadow UAS



M230 30mm Gun

- **Helps to extends lifecycle on new expensive systems**
 - M777 LW 155mm BN costs over \$35M
 - MTADS for AH-64D BN costs over 38M
- **Reduces Maintenance Costs**
 - Repair parts
 - Hazmat
 - Man-hours
- **Improves Readiness**
 - Fewer equipment malfunctions and failures
 - More time spent training and less time spent on repetitive maintenance
 - Over 70% less corrosion maintenance (USMC M198)

- Upon request Shield Technologies will personally deliver a protective cover to any unit for Demonstration/Evaluation
- Contact Mark Bechtel or Phil Simoes at Shield Technologies
 - Mark.Becht@envelopcovers.com
 - 715.441.0280 (Mobile)

